

**METHOD AND APPARATUS FOR REDUCING NOISE
CORRELATION IN A PARTIAL RESPONSE CHANNEL**

ABSTRACT OF THE INVENTION

A method and apparatus for reducing noise correlation in a partial response channel through optimization of a look-ahead maximum likelihood (ML) detector. In the method of the present invention, the ML detector is optimized in light of the noise correlation generated by the partial response channel. The improved ML detector provides comparable performance to, or better performance than, a Viterbi detector in the presence of colored noise. In the present invention, a set of finite impulse response (FIR) transversal filters are used as the ML estimator for the look-ahead detector. The weighted sum outputs of the FIR filters are compared to a set of thresholds based on previously detected data to make the decision for current detection. The present invention improves the ML detector's performance and reduces its complexity by optimizing the coefficients of the FIR filters in the presence of the correlated or colored noise. The SNR (signal-to-noise ratio) of each FIR filter is determined for a range of coefficients based on the noise autocorrelation of the channel for a given user density, and the coefficients providing the highest SNR are selected for each decision function. The result is a noise whitening ML detector providing improved performance and lower complexity than prior art ML detectors.

Figure 4